#include "DHT.h"

#include <Crc16.h>

#define DHTPIN 5 // pin we're connected to

#define DHTTYPE DHT22 // DHT 22 (AM2302)

# define IR 2 // Receive the data from sensor

DHT dht(DHTPIN, DHTTYPE);

Crc16 crc;

int dev\_id=31;

unsigned long value; //map function variable

char command[20]; //serial monitor command

int h; //value of humidity

int t; //value of temperature

int dataFrame[10];

const float pi = 3.14159265; //wind

int period = 10000; //windSensor delay

int radio = 11; //windSensor wingRadius

// Variable definitions

unsigned int Sample = 0; // Sample number

unsigned int counter = 0; // B/W counter for sensor

unsigned int RPM = 0; // Revolutions per minute

int speedwind = 0; // Wind speed (m/s)

int speedwindKm=0; //Wind speed (km/h)

//rain.c

int nRainIn = A1; //RainSensor AnalogInput pin

int nRainDigitalIn = 7; //RainSensor DigitalOutput pin

int nRainVal; //values of Raindrops in 10Bit

int nRainVal\_8b; //values of Raindrops in 10Bit

boolean bIsRaining = false; //Making bIsRaining as Zero

int strRaining; //Value shows rain or not (i.e)0-->no Rain 1--->Rain

unsigned int potentiometer; //value of potentiometer

//rain.c

unsigned long now = 0;

unsigned long then = 0;

boolean flag = true;

void setup()

{

pinMode(13,OUTPUT);

Serial.begin(9600);

dht.begin();

pinMode(2, INPUT); //wind\_input pin

pinMode(7,INPUT); //rain\_digital read pin

delay(3000);

}

void loop()

{

/\*--------------------------DHT22-------------------------------------------------------------------

Sensor detect values ,Send it to h(Humditity),t(Temperature).If Sensor Fails it gives output "000"

-------------------------------------------------------------------------------------------------\*/

if(flag == true)

{

flag=false;

then=millis();

}

potentiometer=analogRead(A3);

value=map(potentiometer,0,1023,1,60);

h = dht.readHumidity();

t = dht.readTemperature();

if (isnan(h) || isnan(t))

{

Serial.println("000");

return;

}

/\*--------------------------------------------RainSensor-----------------------------------

Sensor reads Value from AnalogPin(A1) gives to nRainVal ,nRainVal\_8b gives 8bit\_data,Here

174 is thershold value above this strRaining is 1 ,below this strRaining is 0,When you

want to push data Immeditely give command ABC in Serial Monitor.

-----------------------------------------------------------------------------------------\*/

nRainVal =analogRead(nRainIn);

nRainVal\_8b =255-(map(nRainVal,0,1023,0,255));

bIsRaining = !(digitalRead(nRainDigitalIn));

if(bIsRaining&&nRainVal\_8b>=174)

{

strRaining =1;

}

else

{

strRaining =0;

}

/\*--------------------------------------windSensor-------------------------------\*/

if(Serial.available()>0)

{

char command=Serial.read();

if(command=='A')

{

windvelocity();

RPMcalc();

WindSpeed();

display\_data();command=0;

}

}

now=millis();

if(now-then >= (value\*10000)-10000)

{

windvelocity();

RPMcalc();

WindSpeed();

display\_data();

flag=true;

}

}

/\*---------------Windvelocity()--------------------------------------------

This function gives attach interrupt and calls addcount()to measure wind for 10sec.

------------------------------------------------------------------------\*/

void windvelocity()

{

speedwind = 0;

counter = 0;

attachInterrupt(0, addcount, CHANGE);

//unsigned long millis();

long startTime = millis();

while(millis() < startTime + period)

{

}

digitalWrite(13, LOW);

detachInterrupt(1);

}

/\*---------------------RPMcalc()---------------------------

To calculate Rotation per Minute using counter value

------------------------------------------------------\*/

void RPMcalc()

{

RPM=counter\*6; // Calculate revolutions per minute (RPM)

}

/\*------------------WindSpeed()----------------------------

Calculate WindSpeed in m/s and Km/h

----------------------------------------------------------\*/

void WindSpeed()

{

speedwind = ((2 \* pi \* radio \* RPM)/60) / 1000; // Calculate wind speed on m/s

speedwindKm = speedwind\*3.6; //Calculate wind speed on Km/h

}

/\*-----------------Interrupt addcount()----------------

Interrupt occurs and counter value increments.

----------------------------------------------------\*/

void addcount(){

counter++;

}

/\*------------------------display\_data()--------------------------------------------------------------

this function gives output of Humidity,Temperature,Rain,RainValue,Counter,RPM,SpeedWind in m/s,SpeedWind in Km/h

and calls displayData(),crcProcess()

------------------------------------------------------------------------------------------------------- \*/

void display\_data()

{

digitalWrite(13,HIGH);

Serial.print("~");

Serial.print(dev\_id);

Serial.print(",");

Serial.print(value);

Serial.print(",");

Serial.print(h);

Serial.print(",");

Serial.print("");

Serial.print(t);

Serial.print(",");

Serial.print("");

Serial.print(strRaining);

Serial.print(",");

Serial.print("");

Serial.print(nRainVal\_8b);

Serial.print(",");

Serial.print("");

Serial.print(counter);

Serial.print(",");

Serial.print("");

Serial.print(RPM);

Serial.print(",");

Serial.print("");

Serial.print(speedwind);

Serial.print(",");

Serial.print("");

Serial.print(speedwindKm);

Serial.print(",");

Serial.print("");

displayData(); //summing of all values into array

crcProcess(); //crc process

}

/\*--------------------------DisplayData()--------------------

this function Grouping of value into An array for CRC process

-------------------------------------------------------------\*/

void displayData()

{

int i;

dataFrame[0]=dev\_id;

dataFrame[1]=value;

dataFrame[2]=h;

dataFrame[3]=t;

dataFrame[4]=strRaining;

dataFrame[5]=nRainVal\_8b;

dataFrame[6]= counter ;

dataFrame[7]= RPM ;

dataFrame[8]=speedwind ;

dataFrame[9]=speedwindKm ;

}

/\*-------------------crcProcess()-----------------------

For error free Transistion ,Detect error and processing

------------------------------------------------------\*/

void crcProcess()

{

crc.clearCrc();

for(byte i=0;i<10;i++)

{

crc.updateCrc(dataFrame[i]);

}

unsigned short value = crc.getCrc();

value = calcrc((char\*)dataFrame, 10);

Serial.print(value, HEX);

Serial.println("/");

digitalWrite(13,LOW);

}

int calcrc(char \*ptr, int count)

{

int crc;

char i;

crc = 0;

while (--count >= 0)

{

crc = crc ^ (int) \*ptr++ << 8;

i = 8;

do

{

if (crc & 0x8000)

crc = crc << 1 ^ 0x1021;

else

crc = crc << 1;

} while(--i);

}

return (crc);

}